$$\frac{K(1-e^{-\alpha t})}{RC}+\alpha K e^{-\alpha t}=\frac{E}{RC}$$

$$\Rightarrow Ke^{-\alpha t}\left(\alpha-\frac{1}{RC}\right)+\frac{K}{RC}=\frac{E}{RC}$$

Donc : $\begin{cases} -\dfrac{K}{RC}+\dfrac{E}{RC}=0 \Rightarrow K=E \\ \dfrac{1}{RC}-\alpha=0 \Rightarrow \alpha=\dfrac{1}{RC} \end{cases}$

$$\Rightarrow u_{AB}(t)=E\left(1-e^{-t/RC}\right)$$

4°)

a- $\tau = RC$

$\tau = 10^3 \times 4{,}7 \cdot 10^{-6} = 4{,}7.10^{-3}s$

$\Delta t \approx 5\tau = 5 \times 4{,}7 \cdot 10^{-3} = 23{,}5.10^{-3}s$

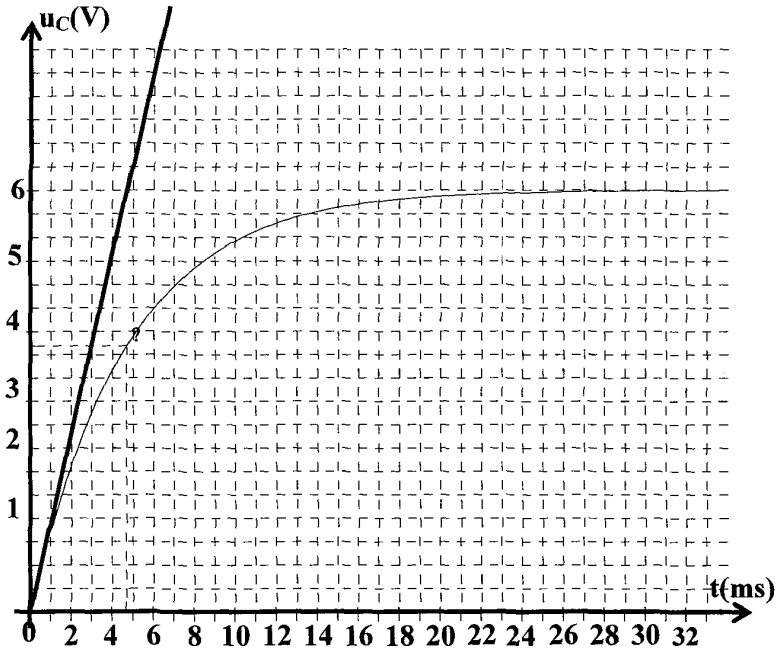
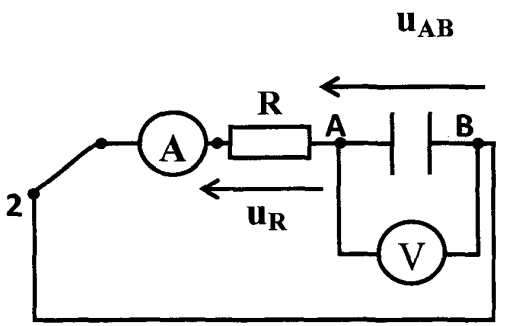
b-Le condensateur est considéré chargé complètement si :

$u_C = 0{,}99\ E \Rightarrow \quad 0{,}99\ E = E\left(1-e^{-\alpha t}\right)$

$\Rightarrow 1-e^{-\alpha t} = 0{,}99 e^{-\alpha t} = 0{,}01 \Rightarrow \ln e^{-\alpha t} = \ln 0{,}01$

$\Rightarrow -\dfrac{t}{\tau} = -4{,}6 \Rightarrow t = 4{,}6\tau$

La durée de la charge $\Delta t = 5\tau = 23{,}5.10^{-3}s$



5°)